

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Inquiry Concerning the Deployment of Advanced	)	GN Docket No. 17-199
Telecommunications Capability to All Americans	)	
in a Reasonable and Timely Fashion	)	

**COMMENTS OF VIASAT, INC.**

ViaSat, Inc. submits these comments in response to the *Thirteenth Section 706 Report Notice of Inquiry* adopted by the Commission on August 8, 2017 in this proceeding (the “*NOI*”). The *NOI* initiates the Commission’s annual assessment of the “availability of advanced telecommunications capability to all Americans” pursuant to Section 706 of the Telecommunications Act of 1996. Among other things, the *NOI* seeks comment on the benchmarks and metrics by which to measure whether fixed and mobile broadband services provide access to advanced telecommunications capability.<sup>1</sup> In addition, the *NOI* seeks comment on actions the Commission can take to accelerate efforts to extend broadband services to all Americans.<sup>2</sup> This submission restates certain previously filed ViaSat views in order to ensure that they are taken into account in this new round of input, as requested by the Commission.<sup>3</sup>

As the leading provider of satellite-based broadband services throughout the United States, ViaSat welcomes the opportunity to provide its perspectives with respect to the issues raised in the *NOI* (which, unsurprisingly, are consistent with those expressed by ViaSat in

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<sup>1</sup> *NOI* ¶ 4.

<sup>2</sup> *Id.* ¶ 46.

<sup>3</sup> *See id.* ¶ 2 (“In light of the changes in the industry and our recent actions to encourage broadband deployment, we propose to start this inquiry afresh, with updated data and questions focused on the current progress of deployment of advanced telecommunications capability.”)

previous years). In particular, ViaSat welcomes the opportunity to update the Commission with respect to the company’s ongoing efforts to deploy high-quality satellite broadband solutions throughout the United States—including services currently achieving the 25/3 Mbps speed threshold and expected to reach 100-plus Mbps following the recent launch of ViaSat-2 on June 1, 2017—and otherwise offer “advanced telecommunications capability” to consumers. ViaSat appreciates the Commission’s recognition of the progress made by ViaSat and the anticipated advances in state-of-the-art broadband technologies that ViaSat is bringing to the United States.<sup>4</sup> In light of this progress, both current and future satellite deployment should be considered fully by the Commission as it prepares the *2018 Section 706 Report*.

ViaSat also welcomes the opportunity to address whether factors other than speed should be considered by the Commission in preparing that report. As a general matter, ViaSat continues to support an approach to evaluating broadband “availability” that reflects that: (i) multiple performance characteristics impact the end-user experience and (ii) there are multiple ways for operators to design their networks to deliver a high-quality experience to consumers. Consistent with this approach, ViaSat opposes the adoption of any latency thresholds — particularly given that: (i) a very small, and ever-decreasing, percentage of Internet traffic is at all latency-sensitive and (ii) the impact of latency, if any, can be offset through appropriate network design.

In addition, ViaSat urges the Commission to ensure that adequate spectrum is available for the next generation of satellite broadband networks in the pending *Spectrum*

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<sup>4</sup> *NOI* ¶ 8.

*Frontiers* proceeding.<sup>5</sup> Through appropriate spectrum policies, the Commission can make high-quality broadband service available to all Americans—no matter where they live or travel.

**I. AMPLE EVIDENCE EXISTS THAT SATELLITE BROADBAND PROVIDERS ARE MAKING “ADVANCED TELECOMMUNICATIONS CAPABILITY” AVAILABLE TO CONSUMERS IN AREAS ACROSS THE COUNTRY**

**A. Satellite Broadband Providers Are Meeting the 25/3 Mbps Speed Threshold and Otherwise Providing High-Quality “Advanced Telecommunications Capability” to Consumers**

The *2016 Broadband Progress Report* found that it would be appropriate to apply the 25/3 Mbps speed threshold applicable to fixed terrestrial services to fixed satellite services, but concluded that no fixed satellite broadband services had met this threshold as of the relevant reporting period.<sup>6</sup> To the extent that this was ever an accurate characterization of the state of satellite broadband deployment prior to the issuance of the *2016 Broadband Progress Report*, this is not the case today. ViaSat currently offers 25/3 Mbps speeds in many areas of the country,<sup>7</sup> and has been expanding its 25/3 Mbps coverage and will be offering even higher speeds throughout its service footprint following commencement of service over ViaSat-2 and, in the near future, ViaSat-3. Indeed, ViaSat-2 will support peak speeds of 100-plus Mbps and ViaSat-3 will provide over one terabit per second (1,000 Gbps) of throughput and burst in the 1

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<sup>5</sup> *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177, et al., Report and Order and Further Notice of Proposed Rulemaking, FCC 16-89 (rel. July 14, 2016) (“*Spectrum Frontiers Order and NPRM*”).

<sup>6</sup> *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, 2016 Broadband Progress Report, 31 FCC Rcd 699, at ¶ 3 (2016).

<sup>7</sup> *See ViaSat Unveils Fastest Home Satellite Internet Service in the U.S. with the New Exede WiFi Modem and a 25 Mbps Plan* (Nov. 18, 2015), available at <http://investors.viasat.com/releasedetail.cfm?ReleaseID=943346>.

Gbps range.<sup>8</sup>

Satellite broadband solutions today meet the Commission's broadband threshold and should be considered fully by the Commission as it prepares the *2018 Broadband Progress Report*.

**B. Satellite Deployment Data Should Be Evaluated in the Same Manner as Terrestrial Deployment Data**

Notwithstanding the high and increasing speeds offered by satellite broadband providers, the *NOI* suggests that satellite deployment data should be viewed differently than terrestrial deployment data. Specifically, the *NOI* seeks comment on how to evaluate satellite deployment data based on the assertion that “beam capacity...is necessarily limited by the number and capacity of the current satellites in operation.”<sup>9</sup>

Any suggestion that satellite networks are capacity-constrained in ways that other networks are not is incorrect. *All* networks, regardless of technology (*e.g.*, wireline, terrestrial wireless, cable, satellite) are capacity-constrained to some degree and lack the ability to simultaneously serve all potential users at particular levels of service. Just like terrestrial networks, satellite networks scale over time to serve a growing customer base through investments that conceptually are no different than those needed to scale terrestrial networks. In fact, in many contexts satellite networks can scale more quickly and efficiently—particularly given dramatic improvements in satellite capacity and capabilities in recent years that have significantly outpaced improvements in terrestrial networks.

The relevant question is not the amount of theoretical capacity on a network, but

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<sup>8</sup> See, *e.g.*, *ViaSat Announces Third Quarter Fiscal Year 2016 Results* (Feb. 9, 2016), available at <http://investors.viasat.com/releasedetail.cfm?ReleaseID=954130>.

<sup>9</sup> *NOI* ¶ 42.

whether and how the network operator manages its network to minimize congestion and provide a high-quality experience to consumers. The networks that ViaSat is deploying allocate adequate per-subscriber bandwidth and otherwise ensure that consumers have that high-quality experience by connecting them directly to high-quality fiber. In contrast, many networks that are nominally “capacity-rich” (including fiber-to-the-node networks) can experience significant congestion issues and “bottlenecks,” which can significantly limit the speed and other benefits supposedly available over those networks (notably, ViaSat is able to bypass many of these congestion issues by delivering traffic directly from the end user to the satellite and from the satellite to an earth station that efficiently connects directly to the rest of the Internet via high-quality fiber, and *vice versa*).<sup>10</sup>

## **II. THE COMMISSION SHOULD ENSURE THAT ITS “AVAILABILITY” CRITERIA ACCOUNT FOR DIFFERENT TECHNOLOGICAL PLATFORMS—INCLUDING THE USE OF SATELLITES**

### **A. The Commission Should Examine Multiple Performance Characteristics in Evaluating the Availability of “Advanced Telecommunications Capability”**

The *NOI* seeks comment on whether it would be appropriate to consider factors other than speed in determining whether advanced telecommunications capability is available in a given area.<sup>11</sup> ViaSat continues to believe that while speed is often the single best predictor of broadband service quality, no single performance criterion adequately measures such quality or, in and of itself, predicts consumer satisfaction with respect to broadband performance.<sup>12</sup>

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<sup>10</sup> See generally Letter from ViaSat to FCC, WC Docket No. 10-90 (May 19, 2016).

<sup>11</sup> *NOI* ¶ 16.

<sup>12</sup> See generally Mark D. Dankberg, Thomas E. Moore, and Girish Chandran, *Toward a National Broadband Plan: Ensuring a Meaningful Understanding of Broadband Capabilities and Facilitating Competitive Choices* (Aug. 31, 2009), attached to Letter from ViaSat to FCC, GN Docket No. 09-51 (Aug. 31, 2009) (discussing the multiple

Accordingly, ViaSat continues to support an approach that would examine multiple factors in determining whether broadband is “available” in a given area for Section 706 purposes, and account for the many different platforms that are and may be used to provide broadband services and other advanced telecommunications capability to consumers.<sup>13</sup>

That said, in evaluating any given service offering for this purpose, the primary question should be whether that offering provides a quality end-user experience—and not whether the underlying network satisfies technical criteria that may or may not have any impact on that experience. As ViaSat has noted previously, in designing and implementing their networks, operators make trade-offs between different performance characteristics. Different network technologies and architectures offer comparative advantages in some areas but not others. For example, some terrestrial networks offer lower-latency service but at relatively low speeds. In contrast, geostationary satellite networks provide relatively high speeds on a consistent basis with moderate levels of latency. The specific network designs implemented by satellite and other network operators—and the specific trade-offs reflected in those designs—should not matter as long as end users enjoy a quality broadband experience. Correspondingly, the Commission should be careful not to adopt “availability” criteria that unnecessarily (and unreasonably) exclude technologies and services that *are* providing consumers with a high-quality broadband experience, based solely on the fact that the design of the underlying network is inconsistent with the Commission’s design expectations.

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dimensions of “broadband” service and cautioning against the adoption of overly restrictive performance standards that could artificially constrain its evolution).

<sup>13</sup> See, e.g., Comments of ViaSat, Inc., GN Docket No. 16-191, at 2-6 (Sep. 15, 2015).

**B. The Commission Should Not Adopt Any Latency Threshold in the Section 706 Context**

Although latency is one factor among many that may have some impact on perceived broadband quality, there is no basis for singling out and adopting a latency threshold in the Section 706 context—particularly where doing so would result in the Commission not “counting” satellite broadband services that are delivering high-quality, 25/3 Mbps, “advanced telecommunications capability” to consumers.<sup>14</sup> ViaSat respectfully submits that there is still no empirical basis for concluding that latency above 100 ms has an adverse impact on the end-user experience that is more significant than any of a half-dozen other performance characteristics that can affect the end-user experience (*e.g.*, high packet loss, high jitter, long page load times, etc.). If anything, recent developments have further eroded the already suspect link between latency and service quality suggested in previous reports and demonstrated that latency thresholds simply do not serve as effective proxies for broadband service quality.

Notably, recent data on broadband usage patterns underscore the fact that the vast majority of broadband traffic is *not* latency-sensitive.<sup>15</sup> Specifically, Sandvine’s *2016 Global Internet Phenomena Report*, published in June 2016, estimates that, in North America, approximately: (i) 67.4 percent of peak period Internet traffic is attributable to streaming video and audio; (ii) 7.2 percent of peak period Internet traffic is attributable to media-related e-commerce; (iii) 5 percent of peak period Internet traffic is attributable to web browsing; and (iv) 3.9 percent of peak period Internet traffic is attributable to social networking. In other words, Sandvine estimates that a minimum of about 83.5 percent of peak period Internet traffic can be

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<sup>14</sup> See NOI ¶ 15.

<sup>15</sup> See <https://www.sandvine.com/downloads/general/global-internet-phenomena/2016/global-internet-phenomena-report-latin-america-and-north-america.pdf>.

ted to applications that are in no way latency-sensitive. But the actual percentage of non-latency-sensitive traffic is even higher; notably, the 83.5 percent figure does not account for the over 12 percent of aggregate traffic that was classified in categories outside of the “Top Five”—including other non-latency-sensitive categories (*e.g.*, file sharing and storage). Notably, “communications” traffic—*i.e.*, applications, services and protocols that allow email, chat, voice, and video communications (not all of which are latency-sensitive)—also did not crack the “Top Five,” suggesting such traffic accounted for less than 3.9 percent of aggregate traffic (and, perhaps, much less).

In other words, the data show that an exceedingly small portion of Internet traffic even conceivably could be impacted by latency. Of course, this does not mean that this traffic *would* be impacted by latency; that would depend on whether the relevant network is properly designed to mitigate the impact (if any) of latency, as is the case with newer satellite networks. And, as ViaSat has observed in the past, hybrid solutions could be used to route traffic that is not latency-sensitive to be routed via satellite, while routing other traffic through terrestrial solutions.

In addition, recent data confirm that consumers do not view latency as a significant factor impacting the broadband experience. For example, an independent study published earlier this year found, based on empirical data, that consumers put a low economic value on reduced latency.<sup>16</sup> It should be noted that ViaSat was not involved in the development of the paper or research supporting the conclusions in the paper.

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<sup>16</sup> Yu-Hsin Liu, Jeffrey Prince, and Scott Wallsten, *Distinguishing Bandwidth and Latency in Households’ Willingness-to-Pay for Broadband Internet Speed*, TECHNOLOGY POLICY INSTITUTE (Aug. 2017), available at <https://techpolicyinstitute.org/wp-content/uploads/2017/08/Distinguishing-Bandwidth-and-Latency-in-Households-Willingness-to-Pay-for.pdf>.

In light of these findings, it would make little sense for the Commission to elevate latency above any other performance criteria or in other contexts to over-penalize latency as part of universal service or other policy decisions.

### **III. THE COMMISSION SHOULD ENSURE THAT SPECTRUM IS MADE AVAILABLE FOR SATELLITE BROADBAND NETWORKS IN THE *SPECTRUM FRONTIERS* PROCEEDING TO ENABLE GROWTH**

The Commission should ensure that adequate spectrum is made available to satellite broadband networks to meet the demands of consumers. Just as terrestrial wireless networks require spectrum to provide higher speeds and capacity, satellite broadband networks, as described above, are being designed, launched, and brought into service that offer exponential increases in speed and capacity to consumers throughout the United States, in fixed locations and on the move. In order to be able to realize the increased capacity demanded, however, satellite broadband networks require access to additional spectrum resources, just like terrestrial networks.

In the pending *Spectrum Frontiers* proceeding, the Commission is developing frameworks for access to spectrum in frequencies above 24 GHz, including in the Q/V bands (e.g., 40/50 GHz), which have long been the anticipated expansion bands for satellite services. As ViaSat has explained in comments and *ex parte* filings in that proceeding, the Commission has an opportunity to make available spectrum access for satellite broadband networks that will allow for growth and expansion of broadband offerings throughout the country. Satellites are being designed and built today that will operate in the Q/V bands in the next five years. Thus, the Commission should ensure that core spectrum is maintained for satellite gateways and user terminals in the 40-42/48.2-50.2 GHz bands. In addition, increased capacity for satellite gateways can be facilitated by permitting flexible access for satellite uplinks in other portions of

the Q/V bands, subject to flexible sharing arrangements. Individually-licensed gateway-type earth stations are capable of operating without impeding terrestrial deployment. Therefore, adopting flexible sharing arrangements that afford satellite networks meaningful access to spectrum outside of the core satellite bands would enable full and effective use of these critical spectrum resources.

## **CONCLUSION**

For the reasons provided above, ViaSat urges the Commission to fully consider satellite broadband deployment in preparing its *2018 Section 706 Report*, particularly in light of the 25/3 Mbps speeds that ViaSat is now providing. ViaSat also opposes the adoption of any latency benchmark in the Section 706 context given that: (i) the vast majority of Internet traffic is not latency-sensitive; and (ii) consumers do not view latency as a significant factor impacting the broadband experience. And, finally, the Commission should ensure that adequate spectrum is made available for satellite broadband networks to expand and grow with consumer demand in the upcoming *Spectrum Frontiers* decision on the Q/V bands.

Respectfully submitted,

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